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SUGARCANE BREEDING AND CULTIVATION IN FLORIDA.  
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A report of the visit of the Station Agronomist to the Everglades  
sugarcane district.

By Robert L. Davis, Agronomist.

INTRODUCTION

The station agronomist was assigned the project of visiting Florida, Georgia and Louisiana for the purpose of studying the methods used in breeding and testing sugarcane varieties in the endeavor to improve the methods used in Puerto Rico. These notes deal with the Florida portion of the trip, omitting for the present the extensive work of the Division of Sugar Plant Investigations of the United States Department of Agriculture at Canal Point, Florida, and in Louisiana and Georgia, which will be discussed in another issue of Agricultural Notes.

The State of Florida maintains a branch agricultural experiment station at Belle Glade where various crops, including sugarcane, are tested, and in cooperation with the United States Sugar Corporation, breeds and tests sugarcane seedlings at Clewiston and Lake Harbor. Dr. B. H. Bourne, Plant Physiologist, is in charge of the cane breeding and testing at Clewiston and Lake Harbor, and, in cooperation with Dr. Bourne, Mr. F. D. Stevens conducts agronomic tests at Belle Glade and Gainesville and other points in the northern part of the state.

Of special interest to Puerto Rican cane growers are the principal varieties under cultivation, the methods of rat control and of making pre-harvest analyses used by Mr. J. V. Fourny, Chemist, of the United States Sugar Corporation, and the method practised by the University of Florida in testing and analyzing large numbers of cane seedlings.

PRINCIPAL CANE VARIETIES UNDER CULTIVATION

The principal varieties grown in Florida are P.O.J. 2725, which thrives on the better muck soils near the margin of Lake Okeechobee, and Coimbatore 290, which seems well adapted to the sandy soil of Fellemsmore. U.S. 139, which was bred at Canal Point by the Division of Sugar Plant Investigations of the United States Department of Agriculture, thrives on the poorer muck soils in the Everglades but is said to be rather low in sucrose content. P.O.J. 2725, which is the principal variety grown in the Everglades, makes a growth quite comparable to that made under Puerto Rican conditions. Production of 40 to 50 tons of cane per acre is not uncommon. P.O.J. 2725 does not ripen until well into January, however, and is severely attacked by the leaf-spot disease. S.C. 12/4 gave good results when first introduced but has since suffered severely from the mosaic or yellow-stripe disease. A variety able to thrive on the poorer muck soils, with a sucrose content high enough for harvest in November and resistance to both mosaic and leaf-spot diseases is needed. Hybrids have been made, using P.O.J. 2725 to secure cane girth and mosaic resistance, Coimbatore 281 to secure early-ripening quality, and several thin semi-wild types of cane to secure vigor and prolific stooling.

P.O.J. 2878 is said to be not successful. On account of the loose nature and high nitrogen content of the prevailing soil type which is a muck soil almost devoid of mineral matter, uprooting with P.O.J. 2878 is much more of a problem than in Puerto Rico. As has been found true in the fertile loose river-bottom soils in Puerto Rico  $\frac{1}{2}$ , P.O.J. 2878 forms numerous water suckers and its juices have been generally unsatisfactory. As the Everglades are very flat and practically treeless, both hurricane winds and winds of moderate violence cause severe damage to sugarcane, particularly to erect types such as P.O.J. 2878.

$\frac{1}{2}$  DAVIS, R. L.

1934. Sugarcane variety P.O.J. 2878 in Puerto Rico, United States Department of Agriculture, Puerto Rico Experiment Station, Bull. 39.  
Lit. cited pp. 11, 14 and 33.



## METHOD OF RAT CONTROL

Rats were making rapid inroads on the soft-milling cane P.O.J. 2725, and several years ago were a serious problem in the Everglades. Losses in some fields reached as high as 50 per cent. The rat damage has been radically reduced by the use of poison baits, the formula employed being prepared and applied as follows:

One quart of water is added to dissolve 55 c.c. of thalium sulphate. A second mixture is prepared containing two quarts of water, 28 grams of cooking soda, 1/2-lb. of laundry starch, three teaspoonfuls of saccharine, and one quart of heavy syrup. Both mixtures are stirred well and heated; just before the boiling point is reached they are added together and mixed thoroughly with 100 lbs. of wheat. After drying the wheat in the sun, small packages are made of waxed paper, each containing one teaspoonful of the poisoned wheat kernels. These packages are scattered in the fields in areas where rat damage is severe and renewed about once or twice a week until the rats are brought under control.

**CAUTION:** Thalium sulphate is extremely poisonous to human beings and other animals and even skin poisoning is possible. The baits and poison materials must be handled with gloves and the fullest precautions taken.

## METHOD OF MAKING PRE-HARVEST ANALYSES

It has been the practice in some parts of Puerto Rico to collect samples of cane for making pre-harvest analyses of the cane juices; these samples in many cases seem inadequate to give a representative analysis for the juices of the field as a whole. Frequently only 2 or 3 canes from a field are ground and the data are inaccurate. This may result in the grinding of immature cane which, in turn, means a considerable money loss. The hand refractometer has been adopted to avoid this trouble by making it possible to analyze a small sample of juice from each of many canes in the field. The use of the hand refractometer has already been described in Agricultural Notes No. 53.2/

The instrument devised by Mr. Fourny and used in connection with the hand refractometer facilitates the securing of samples from a large number of canes and so makes for increased accuracy. A piece of 3/8" steel tubing with the edge of one end sharpened is fastened by screw threads to the end of a closed brass cylinder 2 inches in diameter. At the opposite end of the cylinder is a screw cap which is removable for taking out core samples punched from the cane by means of the steel tube. A number of extra pieces of steel tubing are provided for replacement and resharpening when the sharpened edge of the tube is worn away. In making the pre-harvest analyses of a given field, two men work on opposite sides of it. Each man punches a core from the center of each of 100 canes and the cores are received by the brass cylinders. The 200 cores are placed together in a strong fruit press and a composite juice sample is extracted. Two experienced workers can collect a juice sample of this kind used in about 15 minutes. In order to withstand the excessive pressure needed to squeeze the cane cores, a special brass fruit-press chamber that fits a quart fruit press was devised. It has an inside diameter of 3 inches and outside diameter of 4-1/2 inches. The juice runs out through 14 holes perforated in the bottom which are uniformly 1/8" in diameter for the first 1/4" near the inside of the chamber and then enlarge to 5/8" in diameter on the outside.

After the refractometer readings are taken, the rest of the sample is treated with Horne's dry lead acetate and sent by auto to the sugar-mill laboratory for polariscope reading. Analyses made in this way are said to agree quite closely with crusher-juice analyses taken from car-load grindings made the same day from the same field. This method of making pre-harvest analyses could be used to advantage in Puerto Rico, particularly early in the grinding season when the trouble is experienced in selecting fields which will give satisfactory juices.

## METHODS OF TESTING AND ANALYZING SEEDLINGS

The preliminary tests with sugarcane seedlings are made with the primary object of isolating an early-ripening cane variety. A much higher proportion of the first-year seedlings are carried over into the second-year trials than is customary at Mayaguez, where the primary considerations are weight of stool and resistance to disease and drought. There were 1,100 second-year seedlings under trial in the 1934 grinding season. They were grown in duplicate at Lake Harbor and Belle Glade and all of them were analyzed once, and many twice. A total of 3,400 analyses were made. This is quite an accomplishment, considering the limited personnel. The greatest number of hand-mill analyses made during a single season at the Mayaguez station is 350.

2/ DAVIS, R. L.

1931. The hand refractometer for pre-harvest analysis of sugarcane, Puerto Rico Experiment Station, Agricultural Notes No. 53.



The analytical work in the Everglades was facilitated by using a motorized field laboratory devised by Mr. F. D. Stevens, Agronomist of the Everglades Experiment Station. A small 3-roll cane mill was mounted onto an automobile chassis and coupled directly onto the automobile engine. Any gear-shift automobile engine would serve. The feed roller has to be interchanged with the bagasse roller as the hook-up with the automobile engine reverses the direction of operation. Large samples of cane, about 60 pounds each in size, are ground in the field immediately after harvest, and the labor of bundling and transporting many tons of cane to the experiment-station laboratory is saved. For taking juice samples, brass cylinders large enough for Brix hydrometer readings are used in batteries of 12, supported in racks similar to those used for test tubes in a chemical laboratory. The juice samples are sent promptly to the station laboratory for analysis. If the experimental plantings are at an inconvenient distance, Brix readings are taken in the field and still smaller juice samples, treated with lead acetate, are sent in to headquarters.

Tests made with the Florida seedlings are still in the preliminary stages. A number of them are, however, very promising and arrangements are being made for an interchange so that some of them will be sent to Puerto Rico for trial and the Mayaguez station will in return also send to Florida some of their most promising seedlings of recent origin.

Several of the Mayaguez seedlings, such as Mayaguez 28, 42 and 49, are early in maturity and resistant to mosaic. Since they are also somewhat resistant to leaf-spot and related to P.O.J. 2725, which has given good results in the Everglades, they may prove of value to the Florida sugarcane industry. For information as to results they have given in Puerto Rico, those interested are referred to Agricultural Notes No.61<sup>3/</sup> and Agricultural Notes No.65<sup>4/</sup>.

#### S U M M A R Y

The methods of rat control and making pre-harvest analyses in the Everglades are apparently thorough and effective and worthy of trial in Puerto Rico. The use of a small 3-roll mill mounted on an automobile chassis and connected directly to an automobile engine would greatly facilitate the work of making pre-harvest analyses and testing new sugarcane varieties in Puerto Rico. Arrangements are being made for an interchange of the more promising varieties.

3/ DAVIS, R. L.

1932. Mayaguez 28, 49 and 63, three sugarcane varieties commercially resistant to mosaic. Puerto Rico Experiment Station, Mayaguez; Agricultural Notes No.61.

4/ DAVIS, R. L.

1933. Variety trials of Mayaguez sugarcane seedlings in 1933, Mayaguez 28 shows wide adaptability. Puerto Rico Experiment Station, Mayaguez; Agricultural Notes No.65.



THE UNIVERSITY OF CHICAGO  
DIVISION OF THE PHYSICAL SCIENCES  
DEPARTMENT OF CHEMISTRY  
JAN 10 1925

REPORT OF THE  
COMMISSIONERS OF THE  
LAND OFFICE  
OF THE STATE OF NEW YORK  
FOR THE YEAR 1924

THE LAND OFFICE  
OF THE STATE OF NEW YORK  
HAS THE HONOR TO ACKNOWLEDGE  
THE RECEIPT OF THE  
FOLLOWING REPORT

OF THE  
COMMISSIONERS OF THE  
LAND OFFICE  
FOR THE YEAR 1924

AND TO CERTIFY THAT THE  
SAME HAS BEEN  
FILED IN THE  
OFFICE OF THE  
COMMISSIONERS OF THE  
LAND OFFICE  
OF THE STATE OF NEW YORK  
THIS 10TH DAY OF JANUARY 1925

IN WITNESS WHEREOF  
I HAVE HEREUNTO  
SET MY HAND AND  
THE SEAL OF THE  
STATE OF NEW YORK  
THIS 10TH DAY OF JANUARY 1925